WE CLAIM:

1. A vessel comprising a colorimetric resonant reflectance optical biosensor, wherein the colorimetric resonant reflectance optical biosenseor comprises an internal surface of the vessel, wherein one or more specific binding substances are immobilized at two or more distinct locations on the internal surface of the vessel that comprises a colorimetric resonant reflectance optical biosensor.

2. The vessel of claim 1, wherein the vessel comprises a microtiter well, test tube, petri dish or microfluidic channel.

3. A microtiter plate comprising one or more microtiter wells, wherein a bottom surface of the one or more microtiter wells comprises a colorimetric resonant reflectance optical biosensor, wherein one or more specific binding substances are immobilized at two or more distinct locations on the bottom surface of each microtiter well.

4. A method of detecting binding of one or more types of cells to one or more specific binding substances comprising:

(a) applying the one or more types of cells to an internal surface of a vessel, wherein the internal surface of the vessel comprises a colorimetric resonant reflectance optical biosensor, wherein one or more specific binding substances are immobilized at two or more distinct locations on the internal surface of the vessel that comprises a colorimetric resonant reflectance optical biosensor;

(b) illuminating the vessel with light;

(c) detecting one or more peak wavelength values (PWV) for each distinct location;

wherein, if the one or more cells have bound to one or more specific binding substances, then the PWV is shifted at the distinct location to which the one or more cells are bound.

5. The method of claim 4, wherein the vessel is a microtiter well, microtiter plate, test tube, petri dish or microfluidic channel.

6. The method of claim 4, wherein the one or more specific binding substances are arranged in an array of distinct locations on the internal surface of the vessel that comprises a colorimetric resonant reflectance optical biosensor.

7. The method of claim 6, wherein the distinct locations define an array of spots of about 50-500 microns in diameter.

8. The method of claim 4, wherein the one or more specific binding substances are immobilized on the internal surface of the vessel that comprises a colorimetric resonant reflectance optical biosensor by a method selected from the group consisting of physical adsorption, chemical binding, electrochemical binding, electrostatic binding, hydrophobic binding and hydrophilic binding.

9. The method of claim 4, wherein the one or more specific binding substances are selected from the group consisting of nucleic acids, peptides, protein solutions, peptide solutions, single or double stranded DNA solutions, RNA solutions, RNA-DNA hybrid solutions, solutions containing compounds from a combinatorial chemical library, antigen, polyclonal antibody, monoclonal antibody, single chain antibody (scFv), F(ab) fragment, $F(ab')_2$ fragment, Fv

fragment, small organic molecule, cell, virus, bacteria, polymer and biological sample.

10. A method of detecting binding of one or more cells to one or more specific binding substances comprising:

(a) immobilizing one or more specific binding substances to two or more distinct locations on an internal surface of a vessel, wherein the internal surface of the vessel comprises a colorimetric resonant reflectance optical biosensor;

(b) illuminating the vessel with light;

(c) detecting one or more peak wavelength values (PWVs) for each distinct location;

(d) applying one or more cells to the internal surface of the vessel;

(e) illuminating the vessel with light;

(f) detecting one or more peak wavelength values (PWVs) for each distinct location;

(g) comparing the PWV's of step (c) to the PWV's of step (f);

wherein, if the one or more cells have bound to one or more specific binding substances, then the PWV is shifted at the distinct location to which the cells are bound.

11. The method of claim 10, wherein the vessel is a microtiter well, microtiter plate, test tube, petri dish or microfluidic channel.

12. The method of claim 10, wherein one or more specific binding substances are arranged in an array of distinct locations on the internal surface of the vessel that comprises a colorimetric resonant reflectance optical biosensor

13. The method of claim 12, wherein the distinct locations define an array spot of about 50-500 microns in diameter.

14. The method of claim 10, wherein the one or more specific binding substances are immobilized on the internal surface of the vessel that comprises a colorimetric resonant reflectance optical biosensor by a method selected from the group consisting of physical adsorption, chemical binding, electrochemical binding, electrostatic binding, hydrophobic binding and hydrophilic binding.

15. The method of claim 10, wherein the specific binding substance is selected from the group consisting of nucleic acids, peptides, protein solutions, peptide solutions, single or double stranded DNA solutions, RNA solutions, RNA-DNA hybrid solutions, solutions containing compounds from a combinatorial chemical library, antigen, polyclonal antibody, monoclonal antibody, single chain antibody (scFv), F(ab) fragment, $F(ab')_2$ fragment, Fv fragment, small organic molecule, cell, virus, bacteria, polymer and biological sample.